

LISTING OF CLAIMS

1. (Currently Amended) A circuit for monitoring the state of at least one switch, comprising:

a first monitoring circuit, coupled to a first terminal of a switch, the switch being one of a normally-open switch or a normally-closed switch, the monitoring circuit comprising:

a normally-open detection circuit having a first input coupled to the [fa] first terminal of the switch and including a first sub-circuit for detecting when the switch, if configured as a normally-open switch, closes and the first input has transitioned to a high voltage value, and further including a second sub-circuit for detecting when the switch, if configured as a normally-open switch, closes and the first input has transitioned to a low voltage value, the normally-open detection circuit generating a first signal based on the detection; and

a normally-closed detection circuit having a second input also coupled to the first terminal of the switch and including a first sub-circuit for detecting when the switch, if configured as a normally-closed switch, opens and the second input has transitioned to a high voltage value, and further including a second sub-circuit for detecting when the switch, if configured as a normally-closed switch, closes and the second input has transitioned to a low voltage value, the normally-closed detection circuit generating a second signal based on the detection; and

each detection circuit comprising a configuring circuit receiving a first control signal whose logic state selectively enables , coupled to the first monitoring circuit, for configuring the first monitoring circuit to utilize the normally-open detection circuit and disables disable the normally-closed detection circuit if the first control signal is in a first state switch is a normally open swtch or alternatively enables utilize the normally-closed detection circuit and disables disable the normally-open detection circuit if the first control signal is in a second state, and further receiving a second control signal whose logic state selectively enables one or the other of the first and second sub-circuits based on whether input transition to the high and low voltage values, respectively, is to be detected switch is a normally closed switch.

2. (Previously Presented) The circuit of claim 1, wherein the normally-closed detection circuit includes a closed-to-open circuit for detecting whether the switch changes from a closed state to an open state and for pulling the first terminal of the switch to a voltage representative of one of a logic high state and a logic low state.

3. (Previously Presented) The circuit of claim 2, wherein the closed-to-open circuit is configurable for pulling the first terminal of the switch to a voltage representative of a logic high state and to a logic low state.

4. (Previously Presented) The circuit of claim 3, wherein the closed-to-open circuit comprises:

at least one resistive element;

a first transistor coupled between a first terminal of the at least one resistive element and a high reference voltage source;

a second transistor coupled between the first terminal of the at least one resistive element and the first terminal of the switch;

a third transistor coupled between a second terminal of the at least one resistive element and a low reference voltage source; and

a fourth transistor coupled between the second terminal of the at least one resistive element and the first terminal of the switch.

5. (Previously Presented) The circuit of claim 4, wherein the configuring circuit comprises control circuitry for activating the first transistor and the third transistor at substantially the same time, or activating the second transistor and the fourth transistor at substantially the same time.

6. (Original) The circuit of claim 5, wherein the control circuitry comprises a register.

7. (Previously Presented) The circuit of claim 5, wherein the configuring circuit comprises control circuitry for selectively activating one of the first transistor and the third transistor while occasionally activating the other of the first and third transistors, or for selectively activating one of the second transistor and the fourth transistor while occasionally activating the other of the second and fourth transistors.

8. (Previously Presented) The circuit of claim 1, wherein the normally-open detection circuit includes a open-to-closed circuit for detecting whether the switch changes from an open state to a closed state and for relatively weakly pulling the first terminal of the switch towards a voltage representative of one of a logic high state and a logic low state.

9. (Previously Presented) The circuit of claim 8, wherein the open-to-closed circuit is configurable for pulling the first terminal of the switch to a voltage representative of a logic high state and to a logic low state.

10. (Previously Presented) The circuit of claim 9, wherein the open-to-closed circuit comprises at least one first transistor coupled between a high reference voltage level and the first terminal of the switch, at least one second transistor coupled between a low reference voltage level and the first terminal of the switch, and control logic for generating at least one control signal having a value indicative of a configuration of the open-to-closed circuit, a control terminal of each of the at least one first transistor and the at least one second transistor having a value based upon the value of the at least one control signal.

11. (Previously Presented) The circuit of claim 10, wherein the open-to-closed circuit comprises a first detection circuit having an input coupled to the first terminal of the switch and an output coupled to a control terminal of the at least one first transistor, the at least one control signal being coupled to an input of the first detection circuit, the output of the first detection circuit having a value indicative of the first detection circuit detecting the first terminal of the switch being pulled to a voltage representative of a logic low level.

12. (Original) The circuit of claim 11, wherein the first detection circuit comprises a logic gate with hysteresis.

13. (Previously Presented) The circuit of claim 11, wherein the open-to-closed circuit further comprises a second detection circuit having an input coupled to the first terminal of the switch and an output coupled to a control terminal of the at least one second transistor, the at least one control signal being coupled to an input of the second detection circuit, the output of the second detection circuit having a value indicative of the second detection circuit detecting the first terminal of the switch being pulled to a voltage representative of a logic high value.

14. (Previously Presented) The circuit of claim 13, wherein the open-to-closed circuit further comprises an output circuit having a first input coupled to the output of the first detection circuit, a second input coupled to the output of the second detection circuit, and an output having a value representative of one of the first and second detection circuits detecting the switch being closed.

Claims 15-20. (Canceled).

21. (Currently Amended) A system, comprising:

a switch having a first conduction terminal and a second conduction terminal, the switch being one of a normally-open switch or a normally-closed switch;

a first circuit coupled to the first conduction terminal of the switch for detecting the switch opening and generating if activated a signal indicative of that detection;

a second circuit coupled to the first conduction terminal of the switch for detecting the switch closing and generating if activated a signal indicative of that detection;

a third circuit coupled to the first circuit and the second circuit for configuring the first and second circuits by activating the first circuit and deactivating the second circuit if the switch is a normally-closed switch and deactivating the first circuit and activating the second circuit if the switch is a normally-open switch,

wherein the first circuit comprises:

at least one resistive element;

a first transistor coupled between a first terminal of the at least one resistive element and a high reference voltage source;

a second transistor coupled between the first terminal of the at least one resistive element and the first conduction terminal of the switch;

a third transistor coupled between a second terminal of the at least one resistive element and a low reference voltage source; and

a fourth transistor coupled between the first conduction terminal of the switch and the second terminal of the at least one resistive element.

22. (Previously Presented) The system of claim 21, wherein the activated first/second circuit is configurable to one of: selectively pull the first conduction terminal of the switch towards a voltage level representative of a logic high state, or selectively pull the first conduction terminal of the switch towards a voltage level representative of a logic low state.

23. (Previously Presented) The system of claim 22, wherein the activated circuit selectively weakly pulls the first terminal of the switch towards a certain logic state, relative to a drive strength of the switch to pull the first terminal thereof towards a different logic state.

24. (Canceled).

25. (Currently Amended) The system of claim 21 24, wherein the first circuit further comprises control circuitry for selectively activating the first and third transistors at substantially the same time, and selectively activating the second and fourth transistors at substantially the same time.

26. (Currently Amended) The system of claim 21 24, wherein the first circuit further comprises control circuitry for selectively activating one of the first and third transistors while occasionally activating the other of the first and third transistors, and for selectively activating one of the second and fourth transistors while occasionally activating the other of the second and fourth transistors.

27. (New) A circuit for monitoring the state of at least one switch, the switch being one of a normally-open switch or a normally-closed switch, the monitoring circuit comprising:

a normally-open detection circuit having a first input coupled to receive a signal from the switch for detecting when the switch, if configured as a normally-open switch, closes and generating a first signal based on the detection, the normally-open detection circuit further including an enable circuit responsive to a received first enable signal for selectively enabling operation of the normally-open detection circuit;

a normally-closed detection circuit having a second input also coupled to received the same signal from the switch for detecting when the switch, if configured as a normally-closed switch, opens and generating a second signal based on the detection, the normally-closed detection circuit further including an enable circuit responsive to a received second enable signal for selectively enabling operation of the normally-closed detection circuit; and

a control circuit responsive to a control signal for generating the first and second enable signals to have opposite logic states so as to enable the normally-open detection circuit and disable the normally-closed detection circuit if the switch is configured as a normally-open switch and alternatively enable the normally-closed detection circuit and disable the normally-open detection circuit if the switch is configured as a normally-closed switch.

28. (New) The circuit of claim 27:

wherein the normally-open detection circuit further includes:

a first sub-circuit for detecting a transition of the first input to a low voltage value as an indication that the switch, if configured as a normally-closed switch, has closed; and

a second sub-circuit for detecting a transition of the first input to a high voltage value as an indication that the switch, if configured as a normally-closed switch, has closed;

wherein the normally-closed detection circuit further includes:

a first sub-circuit for detecting a transition of the first input to a low voltage value as an indication that the switch, if configured as a normally-closed switch, has closed; and

a second sub-circuit for detecting a transition of the first input to a high voltage value as an indication that the switch, if configured as a normally-closed switch, has closed; and

wherein the control circuit is further responsive to a second control signal whose logic state to selectively enable one or the other of the first and second sub-circuits based on whether transition to the high and low voltage values, respectively, is to be detected.